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We claim:

1.   Apparatus for providing a web-accessible virtual
processing environment to a network-connected office
server for a remotely connected user computer through
which a user stationed at the computer can execute any of
a plurality of server-based applications resident at the
office server, comprising:
        a platform, capable of being situated in network
communication between the user computer and the office
server, having:
                a processor;
                a memory connected to the processor and for
storing computer executable instructions therein;
                first and second network interfaces, operable
in conjunction with the processor, for interfacing the
platform, through the first network interface, to a wide
area network (WAN) connection through which the remote
user computer obtains connectivity to the platform, and,
through the second network interface, to a local area
network (LAN) having a server computer electrically
communicative thereover, respectively, with the server
computer forming the office server; and
                wherein, in response to the executable
instructions, the processor, for each one of the
server-based applications:
                        provides, through a corresponding client
application module implemented on the platform for each
of the server-based applications, bi-directional protocol

28   conversion of messages between the remote user computer

29   and the office server, such that user interaction data,

30   intended for a specific one of the server-based

31   applications and provided by a browser executing on the

32   remote user computer in a first protocol, is converted

33   into a second protocol associated with said one

34   server-based application and then applied to the

35   server-based application at the office server, and output

36   data, provided by said specific one server-based

37   application, is converted from the second protocol to the

38   first protocol for being transmitted to the user computer

39   and graphically rendered thereat, through the browser, to

40   the user.

1   2.   The apparatus in claim 1 wherein the processor, in

2   response to execution of the stored instructions:

3   for messages emanating from the user computer and

4   appearing on the WAN connection:

5   receives, from the browser, a first message

6   containing the user interaction data associated with a

7   specific one server-based application and in the first

8   protocol;

9   converts the user interaction data in the first

10   protocol to the second protocol associated with the

11   specific one server-based application to yield a second

12   message; and

13   applies the second message, as input, to the

14   server computer for processing by the specific one

15   server-based application; and

16   for messages emanating from the server computer and
17 appearing on the LAN:
18   receives, from the server computer and over the
19 LAN connection, a third message containing output data
20 generated by the specific one server-based application
21 and in the second protocol;
22   converts the output data message in the second
23 protocol to the first protocol to yield a fourth message;
24 and
25   applies the fourth message to the WAN
26 connection for transmission to the browser in order to
27 render the output data thereat.

1   3.   The apparatus in claim 2 wherein the server computer
2 comprises a corresponding server for each of the
3 server-based applications and is implemented either
4 coincident with the platform or as at least one physical
5 computer separate from the platform and connected, via
6 the LAN, to it.

1   4.   The apparatus in claim 3 further comprising, in the
2 platform, a separate corresponding software-implemented
3 application module for each of the specific server-based
4 applications for providing protocol translation of the
5 user interaction data and output data between the first
6 and second protocols; the application module comprises:
7   a user interaction component communicative, through
8 the WAN connection, with the browser, for accepting the
9 user interaction data from the browser in the first

10   protocol and for providing said output data to the

11   browser in the first protocol;

12   a state machine, communicative through an

13   application processing interface with the user

14   interaction component, for interpreting each command

15   issued by the user interaction component so as to provide

16   the user interaction data to the specific one

17   server-based application executing on the server

18   computer, and communicative through a client protocol

19   component, for sending user interaction data to the

20   server-based application and for receiving said output

21   information from the specific one server-based

22   application; and

23   a client protocol component, operative in

24   conjunction with the state machine, for converting the

25   user interaction data received from the state machine

26   into the second protocol and applying resultant messages

27   in the second protocol to the specific one server-based

28   application, and for receiving said output data in the

29   second protocol from the specific one server-based

30   application and applying said output data to the state

31   machine.

1   5.   The apparatus in claim 4 wherein the server-based

2   applications comprise thin-client application hosting,

3   e-mail and shared file access; and the first protocol

4   comprises HTTP, secure HTTP, or a protocol with AIP-like

5   functionality and the second protocol comprises RDP

6   (remote desktop protocol), IMAP (Internet mail access

7   protocol) or SMB (server message block).

1. 6.   The apparatus in claim 5 wherein the user

2   interaction data comprises a designation of a uniform

3   resource locator (URL), uniform resource identifier

4   (URI), form input, keystrokes or mouse clicks that

5   returns associated information desired by the user, and

6   output data comprises graphical display data.

1   7.   The apparatus in claim 6 wherein said output data

2   comprises bitmap graphic output display data generated by

3   the specific one server-based application.

1   8.   The apparatus in claim 7 wherein the WAN connection

2   comprises either a private network connection or an

3   Internet connection.

1   9.   The apparatus in claim 8 wherein the second network

2   interface comprises an Ethernet interface, and the first

3   network interface comprises a broadband network

4   interface.

1   10.   The apparatus in claim 9 wherein the broadband

2   network interface comprises a digital subscriber line

3   (DSL) interface, a cable modem, an integrated services

4   digital network (ISDN) interface, a T1 interface or a

5   fractional T1 interface.

1   11. A method for use, in apparatus, which provides for

2   providing a web-accessible virtual processing environment

3   to a network-connected office server for a remotely

4   connected user computer through which a user stationed at

5   the computer can execute any of a plurality of

6   server-based applications resident at the office server,

7   the apparatus comprising a platform, capable of being

8   situated in network communication between the user

9   computer and the office server, having: a processor, a

10 memory connected to the processor and for storing

11 computer executable instructions therein; first and

12 second network interfaces, operable in conjunction with

13 the processor, for interfacing the platform, through the

14 first network interface, to a wide area network (WAN)

15 connection through which the remote user computer obtains

16 connectivity to the platform, and, through the second

17 network interface, to a local area network (LAN) having a

18 server computer electrically communicative thereover,

19 respectively, with the server computer forming the office

20 server; wherein, the method comprises the steps,

21 performed by the processor, for each one of the

22 server-based applications:

23   providing, through a corresponding client

24 application module implemented on the platform for each

25 of the server-based applications, bi-directional protocol

26 conversion of messages between the remote user computer

27 and the office server, wherein the providing step

28 comprises the steps of:

29   converting user interaction data, intended for

30   a specific one of the server-based applications and

31   provided by a browser executing on the remote user

32   computer from a first protocol into a second protocol

33   associated with said one server-based application so as

34   to yield converted user interaction data;

35   applying the converted user interaction data to

:36   the server-based application at the office server;

37   converting output data, provided by said

38   specific one server-based application, from the second

39   protocol to the first protocol so as to yield converted

40   output data; and

41   transmitting the converted output data to the

42   user computer to be graphically rendered thereat, through

43   the browser, to the user.

1   12.   The method in claim 11 further comprising the steps

2   of:

3   for messages emanating from the user computer and

4   appearing on the WAN connection:

5   receiving, from the browser, a first message

6   containing the user interaction data associated with a

7   specific one server-based application and in the first

8   protocol;

9   converting the user interaction data in the

10   first protocol to the second protocol associated with the

11   specific one server-based application to yield a second

12   message; and

13   applying the second message, as input, to the
14 server computer for processing by the specific one
15 server-based application; and
16   for messages emanating from the server computer and
17 appearing on the LAN:
18   receiving, from the server computer and over
19 the LAN connection, a third message containing output
20 data generated by the specific one server-based
21 application and in the second protocol;
22   converting the output data message in the
23 second protocol to the first protocol to yield a fourth
24 message; and
25   applying the fourth message to the WAN
26 connection for transmission to the browser in order to
27 render the output data thereat.

1   13. The method in claim 12 further comprising the SEP of
2 implementing a corresponding server for each of the
3 server-based applications either coincident with the
4 platform or as at least one physical computer separate
5 from the platform and connected, via the LAN, to it.

1   14. The method in claim 13 further comprising the step
2 of providing protocol translation of the user interaction
3 data and output data between the first and second
4 protocols through a separate software-implemented
5 application module for each of the specific server-based
6 applications; wherein the application module comprises:

7   a user interaction component communicative, through

8 the WAN connection, with the browser, for accepting the

9 user interaction data from the browser in the first

10 protocol and for providing said output data to the

11 browser in the first protocol;

12   a state machine, communicative through an

13 application processing interface with the user

14 interaction component, for interpreting each command

15 issued by the user interaction component so as to provide

16 the user interaction data to the specific one

17 server-based application executing on the server

18 computer, and communicative through a client protocol

19 component, for sending user interaction data to the

20 server-based application and for receiving said output

21 information from the specific one server-based

22 application; and

23   a client protocol component, operative in

24 conjunction with the state machine, for converting the

25 user interaction data received from the state machine

26 into the second protocol and applying resultant messages

27 in the second protocol to the specific one server-based

28 application, and for receiving said output data in the

29 second protocol from the specific one server-based

30 application and applying said output data to the state

31 machine.

1 15. The method in claim 14 wherein the server-based

2 applications comprise thin-client application hosting,

3 e-mail and shared file access; and the first protocol

4   comprises HTTP, secure HTTP, or a protocol with AIP-like
5   functionality and the second protocol comprises RDP
6   (remote desktop protocol), IMAP (Internet mail access
7   protocol) or SMB (server message block).

1   16.   The method in claim 15 wherein the user interaction
2   data comprises a designation of a uniform resource
3   locator (URL), uniform resource identifier (URI), form
4   input data, user keystrokes or user mouse clicks that
5   returns associated information desired by the user, and
6   the output data comprises graphical display data.

1   17.   The method in claim 16 wherein said output data
2   comprises bitmap graphic output display data generated by
3   the specific one server-based application.

1   18.   The method in claim 17 wherein the WAN connection
2   comprises either a private network connection or an
3   Internet connection.

1   19.   The method in claim 18 wherein the second network
2   interface comprises an Ethernet interface, and the first
3   network interface comprises a broadband network
4   interface.

1   20.   The method in claim 19 wherein the broadband network
2   interface comprises a digital subscriber line (DSL)
3   interface, a cable modem, an integrated services digital

4   network (ISDN) interface, a T1 interface or a fractional

5   T1 interface.